

**WHAT IS CLAIMED IS:**

1 1. A method for measuring surface irregularities,  
2 comprising:  
3 illuminating a surface by at least two sources of light  
4 arranged along a row which is substantially  
5 perpendicular to a reference plane along which said  
6 surface is arranged,  
7 determining an angle of incidence to at least one  
8 partial surface of said surface for each of said at  
9 least two sources of light,  
10 generating a set of reflections from said surface for  
11 each of said at least two sources of light, wherein  
12 each set contains at least one reflection from said  
13 partial surface,  
14 detecting with a light detector said set of reflections  
15 for each of said at least two sources of light,  
16 extrapolating for each of said at least one partial  
17 surface an imaginary angle of incidence for which no  
18 reflection would be detected, said extrapolating being  
19 based on said set of reflections and said angle of  
20 incidence to said at least one partial surface for each  
21 of said at least two sources of light;  
22 determining a first surface slope value of said partial  
23 surface, said determining being based on said imaginary  
24 angle of incidence; and  
25 determining a first height profile for said surface,  
26 said height profile being based on said first surface  
27 slope value for said partial surface of said surface.

1 2. The method of claim 1, wherein said surface slope  
2 value is determined in more than one horizontal  
3 direction.

1 3. The method of claim 1, wherein said detecting said  
2 set of reflections for each of said at least two  
3 sources of light is carried out for each resolution  
4 pixel of said light detector.

1 4. The method of claim 3, wherein an iteration  
2 process for acquiring said surface height profile for  
3 the surface by integrating the slopes values ( $\alpha_x(x,y)$ ,  
4  $\alpha_y(x,y)$ ) into a surface ( $z(x,y)$ ) is executed as  
5 described in the following:

6 a. Every image pixel gets an initial height  
7 value  $z(x,y)$ ,

8 b. Every pixel is tilted accordingly to  $\alpha_x(x,y)$   
9 and  $\alpha_y(x,y)$ ,

10 c. A height correction value  $\text{corr}(x,y)$  is  
11 calculated for every pixel as the mean height  
12 difference between the edges of the pixel and  
13 its four neighbours,

14 d. For every pixel:  $z(x,y) = z_{\text{old}}(x,y) -$   
15  $\text{corr}(x,y)$ , and

16 e. Steps c and d are repeated until a  
17 sufficient result is acquired.

1 5. The method of claim 4, wherein said iteration  
2 process is first carried out on relatively large  
3 surface elements, thus giving initial height values for  
4 iteration for relatively small surface elements.

1 6. An arrangement for measuring and evaluating  
2 surface irregularities, which arrangement comprises at  
3 least two sources of light arranged so as to illuminate  
4 a surface, said sources of light being arranged along a  
5 row which is substantially perpendicular to a reference  
6 plane along which said surface is arranged, each one of  
7 said sources of light presenting an angle of incidence  
8 to at least one partial surface forming part of said  
9 surface, said arrangement also comprising a control  
10 unit arranged so as to generate, by means of each  
11 source of light, a set of reflections respectively from  
12 said surface, wherein each set contains at least one  
13 reflection from said partial surface, and a light-  
14 sensitive detector arranged to detect said sets of  
15 reflections, characterized in that said control unit is  
16 adapted for extrapolating, for each partial surface and  
17 by means of detected light intensities for each one of  
18 the at least two light sources and their associated  
19 angles of incidence, an imaginary angle of incidence  
20 for which no reflection would be detected, said control  
21 unit furthermore being adapted for providing by means  
22 of said imaginary angle of incidence a surface slope  
23 value ( $\alpha$ ) of said partial surface in the direction of  
24 said sources of light, and for acquiring a height  
25 profile for said surface by means of the slope values  
26 for the partial surfaces of said surface.

1 7. The apparatus of claim 6, wherein said at least  
2 two of said sources of light constitute a generally  
3 vertical lamp array.

1 8. The apparatus of claim 7, wherein said sources of  
2 light are arranged along at least two generally  
3 vertical lamp arrays which are positioned in pairs  
4 substantially opposite to each other.